grid australia
BACKBONE OF THE NEM

Technical Standards Review

Response to Reliability Panel Issues Paper

13 June 2008

Powerlink Queensland · TransGrid · ElectraNet electricity transmission · TRANSEND · SP AusNet A member of Singapore Power Group

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1. Introduction

This submission is made by Grid Australia (formally the Electricity Transmission Network Owners Forum), which comprises ElectraNet Pty Limited, Powerlink Queensland, SP AusNet, Transend Networks Pty Ltd and TransGrid. Collectively, this group owns and operates over 40,000 km of high voltage transmission lines and have assets in service with a current regulatory value in excess of $10 billion.

Grid Australia welcomes the opportunity to respond to the Australian Energy Market Commission (AEMC) Reliability Panel's Technical Standards Review Issues Paper (dated 9 May 2008).

To facilitate the Review, the Reliability Panel has clearly stated its objectives, and formulated a number of general questions to assist in achieving these objectives, and sought comments from stakeholders on any other related aspects of the existing technical standards that ought to be addressed by this review.

With the Panel's proposed framework in mind the remainder of this submission is structured into the following three major sections:

- Achieving the objectives of the review
- Responding to the Panel's general questions
- Other possible matters for consideration

2. Achieving the Stated Objectives of This Review

The Panel's stated objectives for this Review are:

1. determine principles for assessing the effectiveness of the existing technical standards;
2. identify areas where improvements can be made to the technical standards; and
3. propose processes for implementing the appropriate amendments to the standards.

Each of these is briefly discussed in turn.

2.1 Principles for Assessing the Effectiveness of Existing Technical Standards

Grid Australia considers that the success of this Review hinges on the clear articulation of appropriate assessment principles early in the Review, and then applying these principles in a disciplined manner.

In this regard the starting point, in line with the requirements of the National Electricity Law, is the achievement of the National Electricity Objective[1].

Given the implications for system security, efficient investment over time, and the long term interests of consumers, all vital elements of the National Electricity Objective, it remains appropriate for Technical standards, and the processes for managing these standards, to continue to be addressed within the Rules.

This results in two very important outcomes as follows:

- Changes to requirements relating to technical standards are assessed in a transparent manner over time against the National Electricity Objective.
- Any recommendations resulting from this Review would only generally be given effect by changes to the Rules, and would therefore need to be justified in terms of enhancing the National Electricity Objective.

With the requirements of the National Electricity Objective in mind, Grid Australia recommends that the following supporting principles be adopted by the Reliability Panel in undertaking its review:

- the rights established for parties to existing connection agreements are protected for the duration of those connection agreements;
- new connection applications, and changes to the technical performance of parties already connected to the power system, are managed in a way that ensures the achievement of system standards;
- the performance of all parties connected and/or seeking connection to the transmission system be clearly defined and available to Network Service Providers (NSPs) and NEMMCO, and other legitimate stakeholders;
- the roles and responsibilities of NSPs (and all other participants) in the management of technical standards are clear and appropriate;
- Standards support the market entry of new generation regardless of technology; and
- Standards are consistent with relevant national and international standards and good practice.

Each of these principles contributes to the National Electricity Objective by ensuring the efficient provision of transmission and generation investment, as well as assisting in the management of system security over time.

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[1] To promote efficient investment in, and efficient operation and use of, electricity services for the long-term interests of consumers of electricity with respect to–

1. price, quality, safety, reliability, and security of supply of electricity; and
2. the reliability, safety, and security of the national electricity system.

2.2 Identifying Areas Where Improvements can be made

Potential areas for improvement to technical standards are discussed in more detail in Section 3 of this submission. In summary, Grid Australia has identified the following possible areas for improvement to the Technical Standards:

- a proper assessment of the costs to all parties of retaining significant scope for negotiation of the performance requirements of plant connecting to the power system. This includes reducing the delays in the connection process and associated generation investment, while minimising power system performance risk;
- a reduction in the scope for connection applicants to negotiate performance standards below the automatic access standards;
- improved clarity of the definition of some technical standards;
- reconsideration of the need for confidentiality requirements associated with the technical performance of plant connected to the power system;
- more standardisation of performance requirements of specific generation technologies in order to streamline the connection application processes and, thus, timely investment in these technologies; and
- the review of specific performance requirements as set out in Section 3.2 below.

2.3 Processes for Implementing the Appropriate Amendments to the Standards

As noted above, technical standards, and the processes for managing technical standards, are central to the achievement of the National Electricity Objective. Degradation of the standards themselves, and of the framework for managing technical standards, increases the risk that commercial drivers on individual market participants will lead to a deterioration of power system security, reliability, and the quality of services provided to users of the system. In the extreme, this can lead to major power system interruptions with serious short term economic consequences and high likelihood of consequential non-market intervention by Government into the operation of the market. This, in turn, imposes material risks to investors in this market.

For these reasons the management of technical standards must be supported by the 'force of law' while preserving scope for the efficient and orderly evolution of arrangements over time. The use of the National Electricity Rules to set out a detailed framework achieves both these outcomes.

Therefore, Grid Australia supports the continued use of the National Electricity Rules as the primary vehicle for detailing the required framework for managing technical standards. This logic also extends to the implementation of amendments to standards.

3. Responding to the Panel's General Questions

The Panel is seeking responses to the following general questions:

1. Are the current standards of the correct form?
2. Are the current standards set at appropriate levels?
3. Is the scope of the technical standards appropriate?
4. Are the technical standards well structured in the Rules?
5. Are the obligations between NSPs and network users consistent?
6. Which aspects of the technical standards need more urgent attention?
7. Grid Australia's response to each of these questions is set out in turn in this section.

3.1 Are the Current Standards of the Correct Form?

The Panel states that it is important that the technical standards in the Chapter 5 schedules are suitable for each of their applications under the Rules. Grid Australia agrees with this requirement.

The Panel further states that the technical standards should be in a form that:

1. aligns the technical performance of the power system and its components with the philosophy used to manage power system security and reliability, as defined in Chapter 4 of the Rules and in NEMMCO's operating procedures;
2. allows network users, NSPs and NEMMCO to assess and negotiate the technical aspects of applications to connect to the power system; and
3. adequately specifies the technical performance of the power system and its components, allowing suitable compliance programs and enforcement regimes to be implemented.

Grid Australia is concerned that the full scope of an NSP's responsibilities is not sufficiently understood in the Issues Paper generally, including in the formulation of the second of the above mentioned criteria.

As a result, Grid Australia is concerned that the difficulties resulting from expressing performance standards in the form of 'automatic' or 'minimum' standards may not be fully appreciated by all market participants. In Grid Australia's experience, providing Connection Applicants with the option of negotiated standards that are equal to or better than the minimum standards inevitably complicates and delays the processing of connection applications. This, in turn, can delay the efficient development of new investments requiring network access.

Specifically, NSPs, (particularly TNSPs) are confronted with a complex assessment task each time a new connection application, or variation to an existing connection application, is lodged. NSPs generally have numerous connection agreements already in place, with obligations to ensure that counter parties to those agreements receive a certain quality of network service. Grid Australia notes that, in this regard, the parameters that define quality are widely defined by Schedule 5.2 of the Rules

The more often a performance standard proposed by an access seeker is below the automatic access standard, the more complex and time consuming the process of assessing and negotiating a new connection arrangement becomes. This is compounded by the tendency for access seekers to adopt the minimum standard as the default negotiated standard. Negotiated standards also add complexity to the subsequent compliance assurance processes by complicating the make-up of the supporting performance compliance assessments.

In relation to the third of the above mentioned criteria, NSPs require the application of robust assurance processes to be applied to access seekers. This is needed for NSPs to be confident that the models of performance standards provided by access seekers are accurate, and remain accurate over time. Otherwise, it is not possible to plan and develop networks with confidence in a way that preserves the required system standards. This, in turn, encourages more conservative investment assumptions and, potentially, less efficient investment decisions over time and/or more conservative constraints being applied to market dispatch.

The formulation of technical standards, involving options for access seekers to adopt performance levels below the automatic standards, also complicates the achievement of the third above mentioned criteria. This is due, in part, to the need to tailor compliance assessment to a wider range of performance specifications.

Finally, as a general observation the form of the standards in the Rules ought to be as clear and unambiguous as possible. This outcome benefits all parties involved in the process of administering technical standards requirements. Examples where there is scope for improvement include being more specific in terms of physical quantity, and avoiding the use of general terms such as “control systems”.

3.2 Are the Current Standards Set at Appropriate Levels?

The Panel notes that the level of each of the technical standards is an economic and technical trade-off between the benefits delivered by the standard and the costs of it being achieved. This trade-off seeks to effectively manage the interactions between the system, access and plant-specific standards as a whole.

With this in mind, the Panel seeks stakeholder’s views on the levels of the current technical standards, in particular, the level of the minimum and automatic access standards, and hence the flexibility for negotiated standards.

In response Grid Australia notes that there is a reasonable basis for encouraging the adoption of the automatic access standards as the appropriate performance level for plant seeking access. That is, the ‘onus of proof’ that it is necessary to move away from the automatic access standards ought to be shifted to the access seeker. Reasons for this position include:

- System standards in the NEM are consistent with standards applicable to similar interconnected high voltage power systems elsewhere in the world and should, therefore, not generally impose a burden in terms of the required performance standards from access seekers.

- The more scope there is for negotiated performance standards the more complex and time consuming the connection application process becomes. As noted above, this has impacts on the timeliness of critical investment in generation and major new loads.

- Acceptance of a low performance standard from a connection applicant today can result in someone else paying for the 'shortfall' in the future. For example, accepting 'sub-automatic' reactive power capability from an applicant simply usually means that future reactive power shortfalls are made up at the expense of other participants via NEMMCO or NSP reactive support contracts, or direct investment by an NSP in reactive plant.

Furthermore, Grid Australia has identified the levels of the following specific system standards as potential candidates for review:

- The value for fault clearance time in Column 4 for 400kV and above in S5.1a.8 (table S5.1a.2) - the time of 175mS for CB fail is proving to be prohibitively expensive to achieve, even with the most modern power system equipment. Furthermore, there is reason to believe that attempts to achieve these outcomes actually reduce overall system security by increasing the probability of multiple contingency events.

- The permissible overvoltage following a credible contingency event is governed by Fig S5.1a.1 in S5.1a.4. This figure has altered from its earliest form and quite possibly this was not intentional. The 10% over-voltage now extends to the time extremity of the chart (with obvious uncertainty as to the intended meaning), whereas previously there was a distinct end point. This has an impact on plant specification.

- The power factor requirements in S5.3.5 need to be considered in the context of overall management of reactive capability. For example, a participant would seek to meet the minimum access standard and provide surplus reactive capability for "sale" to an NSP or NEMMCO to meet future system development (NSP) or assist in operating the system securely (NEMMCO).

- The automatic access standards fail to consider that a model provided by a connection applicant require ongoing analysis. At a minimum, the automatic access standard should require monitoring and recording facilities for key variables including controller inputs and controller output. This ensures dynamic studies covering normal and abnormal conditions can be remodelled by the relevant NSP.

3.3 Is the Scope of the Technical Standards Appropriate?

The Panel notes the importance of the Chapter 5 schedules in defining the different aspects of the technical requirements of the NEM power system and its components. The Panel also correctly observes that each of these specific technical requirements

should serve an appropriate purpose in terms of managing the security of the power system and the quality of the electricity delivered to customers.

It is in this context that the Panel is seeking comments from stakeholders on the scope of the current technical standards. In addition the Panel is seeking views as to which aspects of the technical standards could be removed or added to the current standards.

As a general observation Grid Australia re-iterates its position that the scope of coverage of these requirements within the Rules is generally appropriate. That is, Grid Australia does not see any merit in reducing the scope of coverage in the Rules in favour of subsidiary instruments or processes. However, this does not mean that requirements cannot be simplified and clarified within the Rules.

3.4 Are the Technical Standards Well Structured in the Rules?

The Panel notes that the technical obligations placed on the different NEM participants need to be clearly defined to effectively manage the operation of the NEM power system. On this basis the Panel concludes that the technical standards contained in the Chapter 5 schedules need to be well structured and unambiguously defined. With this in mind the Panel seeks comments from stakeholders on the structure of the current Chapter 5 schedules and how the technical obligations could be more clearly captured.

Grid Australia considers that the technical obligations imposed on TNSPs within Rules are reasonably well defined. However, there is scope for improvement in at least two aspects:

- The rights and functions of NSPs in approving settings to be applied to generation plant are crucial to ensuring that agreed performance standards are actually delivered. However, the Rules need to be clarified to ensure that NSP approval does not impose liability on NSPs in the event that an incorrect setting is approved. The accountability for meeting agreed performance standards, and, hence, the liabilities for failing to meet agreed standards must remain with the access seeker.

- Certain performance standards are classified as 'NEMMCO advisory matters' because of their relevance to operating the system securely. Similarly, there are a number of performance standards that are crucial to NSPs being able to meet their obligations under the Rules i.e. to manage impacts on existing connection agreements, maintain system standards, and plan and develop the system efficiently. Consideration should be given to establishing a classification of matters that are 'NSP advisory matters'. This would ensure that NSPs had appropriate input to decisions on matters linked directly to NSP accountabilities.

Examples include protection clearance times, fault contribution, AVR and generator excitation systems performance, reactive capability, harmonic contribution, phase unbalance, and 'flicker'.

In terms of structure and location of the technical standards, Grid Australia makes the following comments:

- Placing all technical performance standards in one place (i.e. in the schedules set out Chapter 5, with a separate schedule for each category of NEM Participant), with the rest of the Rules refering to the performance standards as set out in those schedules works well structurally. This arrangement should be maintained to aid in understanding and implementation of the performance standards.

- However, what tends to then undermine this is the inconsistent way the performance standards are referred to (i.e. they are called different things and described in potentially inconsistent ways) in various places in the Rules. For example, it is not clear (in the relevant definitions and in the relevant provisions in chapter 4) precisely which of the Schedule 5 standards relate to reliability and security for the purposes of specific obligations under chapter 4 and (accordingly) the extent to which different parties are responsible for them.

3.5 Are the Obligations between NSPs and Network Users Consistent?

The Panel notes that the security of the NEM power system is managed through the obligations placed on the various NEM participants contained in the technical standards in the Chapter 5 schedules. The Panel proposes that this can be effectively managed where there is an appropriate balance between the different classes of NEM participants, in particular, the balance between the obligations placed on the NSPs, as the operators of the transmission network, and the network users. The Panel seeks the perspectives of stakeholders on this balance in the current technical standards and where this balance could be improved.

Grid Australia observes that the Panel's characterisation of the role of TNSPs in the process for managing technical standards is incomplete. It is important, at this early stage of the review, for the Panel, and stakeholders generally, to fully appreciate the role of TNSPs, in this process; in particular that the TNSP role extends beyond that of 'operators of the network'.

As noted earlier in this submission ,TNSPs are obliged to ensure that, when access is provided to new generators or end users, the service levels to existing network users, as set out in their connection agreements, are not impaired. TNSPs are also required to ensure that system standards continue to be met following each new connection, or changes to the technical performance of an existing connected party. Finally, TNSPs need to have absolute confidence that the technical performance of every connected party is accurately modelled to enable efficient planning and development of the network.

With this in mind Grid Australia is not convinced that the obligations on network users are sufficient to support TNSPs in efficiently meeting their Rules responsibilities. For example, as also noted above, the latitude for network users to adopt performance standards which are below the automatic access standards imposes a significant burden of assessment on TNSPs. While the effort involved is not insurmountable, it has the potential to delay connection to the network at the expense of the applicant and/or impose pressure on TNSPs to assume performance risk in order to facilitate timely connection.

Grid Australia considers that the requirements on intending participants to provide timely and accurate information on proposed technical standards and to verify performance against claimed standards may also warrant review. Failures in this regard add to the costs and delays associated with processing connection applications, and contribute to TNSP performance risks.

On the question of risk, TNSPs face potentially significant liability exposure for failure to meet system standards set out in the Rules, in the event that such failure results in widespread electricity interruptions or damage to connected party equipment. Grid Australia considers it is therefore reasonable to require network users to be forthcoming about changes in the performance of their plant. This applies to new connection applications and existing users already covered by a Connection Agreement. For this reason Grid Australia supports the current rigorous requirements imposed on these parties in relation to plant performance.

In summary, when assessing the relative responsibilities of other participants compared with TNSPs, Grid Australia encourages the Panel to fully recognise the roles and responsibilities imposed on TNSPs by the Rules in relation technical standards.

3.6 Which Aspects of the Technical Standards Need More Urgent Review?

The Panel is seeking views from stakeholders on what priority should be given to the different aspects of the technical standards being reviewed as the basis for determining ongoing work packages to result from this review.

In this regard, Grid Australia considers that the need for various forms of performance information to be treated on confidential basis should be re-examined. The technical performance information of plant connected to the power system is essential to all parties seeking to understand system performance. At the present time it is generally accepted that NEMMCO and TNSPs should have ready access to reliable and detailed information on the technical performance of connected plant. Grid Australia considers that there would be general benefits if this access could be extended to all NEM participants and intending participants, particularly in relation to generator dynamic data and performance models. For example:

- This would enable all parties to fully and independently assess their market positions having regard for all factors impacting on system constraints, thereby enhancing competition generally.

- System studies could be conducted by a wider range of parties enhancing the ability to process connection applications as well as enabling the performance of NEMMCO and TNSPs to be more easily verified by third parties.

The urgency in resolving this matter is illustrated by the recent Rule change request from the National Generator Forum. In addition, Grid Australia is aware of delays in processing current connection applications from intending generation investors because of the inability to share crucial data and models on the dynamic performance of generators already connected to the system.

4. Other Possible Matters for Consideration

There is an increasing diversity of generator fuel source, and size, emerging associated with various schemes to encourage lower greenhouse emissions. As a result, continuing a review of connection process requirements would appear to be warranted. For example, it may be possible to further standardise the technical standards for various classes of similar technologies, such as wind generation, or streamline the performance assessment processes for generators below a certain size.